09/973,778
Art Unit: 1731
Submission under 37 CFR 1.114(a)

Amendments to the Claims

Please amend the claims as follows. This listing of the claims will replace all prior versions, and listings of claims, in the application:

1) (currently amended) A method of making optical quality components, comprising:
   a) depositing silica buffer layers respectively on a front and back face of a silicon wafer by PECVD (Plasma Enhanced Chemical Vapor Deposition) to provide a first structure ~~in~~ resistant to wafer warp during thermal processing;
   b) subjecting said first structure to a first thermal treatment to reduce optical absorption and compressive stress in said buffer layers;
   c) said first thermal treatment comprising:
      i) subjecting said first structure to a temperature that ramps up from a stabilization temperature to a temperature of at least 800°C to decrease compressive stress in said buffer layers from an initial compressive value;
      ii) continuing to subject said first structure to said temperature of at least 800°C for a period of at least 30 minutes to further decrease compressive stress in said buffer layers and reduce optical absorption; and
      iii) ramping down said temperature to which said first structure is subjected to a final temperature such that said first structure undergoes an elastic deformation wherein the compressive stress in said buffer layers increases linearly to a final compressive value that is less than said initial compressive value;
   d) depositing a silica core layer on said buffer layer on said front face of the wafer by PECVD to form a second structure; and
   e) subjecting said second structure to a second thermal treatment to reduce optical absorption and tensile stress in said core[[s]] layer;
   f) said second thermal treatment comprising:
      i) subjecting said second structure to a temperature that ramps up to a temperature of at least 600°C to relieve tensile stress in said core layer from an initial tensile value;
      ii) continuing to subject said second structure to a temperature of at least 600°C for a period of at least 30 minutes to reduce optical absorption; and

09/973,778
Art Unit: 1731
Submission under 37 CFR 114(a)

iii) ramping down said temperature to which said second structure is subjected so that said second structure undergoes elastic deformation and ~~wherein~~ said tensile stress in said core layer decreases linearly to a final tensile value that is less than said initial tensile value.

2.(cancelled)

3.(cancelled)

4.(previously presented) A method as claimed in claim 1, wherein said first structure is maintained at said stabilization temperature for a period of from 1.3 to 130 minutes.

5.(previously presented) A method as claimed in claim 1, wherein said first structure is maintained at said stabilization temperature for a period of about 13 minutes.

6.(currently amended) A method as claimed in claim 3, wherein in step c(i) the temperature of said first structure is ramped up from said stabilization temperature to said temperature of at least 800°C ~~in said first thermal treatment~~ at a rate lying in the range 1°C/min to 25°C/min.

7.(currently amended) A method as claimed in claim 6, wherein ~~the temperature of said first structure in said first thermal treatment is ramped up~~said rate is ~~at~~ 5°C/min.

8.(previously presented) A method as claimed in claim 1, wherein said stabilization temperature lies in the range 300°C to 700°C.

9.(previously presented) A method as claimed in claim 1, wherein said stabilization temperature is about 400°C.

10.(currently amended) A method as claimed in claim 8, wherein in step c(iii) the temperature of said first structure is ramped down to said final temperature at a rate in the range 1°C/min. to 25°C/min.

11.(currently amended) A method as claimed in claim [[9]] 10, wherein ~~the temperature of said first structure is ramped down at~~ said rate is 2.5°C/min.

12.(currently amended) A method as claimed in claim 1, wherein in ~~said first thermal treatment~~step c(ii) the ~~said first structure is maintained at a~~ temperature of at least 800°C to

which said first structure is continued to be subjected for at least 30 minutes ~~that~~ lies in the range of 800°C to 1,300°C ~~for at least 30 minutes~~.

13.(currently amended) A method as claimed in claim 1, wherein in step c(ii) ~~said first thermal treatment said first structure is maintained at a~~the temperature of at least 800°C to which said first structure is continued to be subjected is ~~of about~~ 900°C ~~for at least 30 minutes~~.

14.(previously presented) A method as claimed in claim 1, wherein said first and second thermal treatments are carried out in the presence of an inert gas.

15.(previously presented) A method as claimed in claim 14, wherein said inert gas is selected from the group consisting of: nitrogen, oxygen, hydrogen, water vapour, argon, fluorine, carbon tetrafluoride, nitrogen trifluoride, and hydrogen peroxide.

16.(previously presented) A method as claimed in claim 14, wherein said inert gas has a constant flow rate.

17.(previously presented) A method as claimed in claim 16, wherein said flow rate of said inert gas lies in the range 1 liter/min. to 100 liters/min.

18.(currently amended) A method as claimed in claim 1, wherein in step f(ii) the temperature of at least 600°C to which said second structure is continued to be subjected lies~~said second thermal treatment said second structure is maintained at a temperature lying~~ in the range 600 to 1300°C ~~for at least 30 minutes~~.

19.(currently amended) A method as claimed in claim 18, wherein in step f(ii) the temperature of at least 600°C to which said second structure is continued to be subjected ~~wherein in said second thermal treatment said second structure~~ is ~~maintained at a temperature of~~ 900°C ~~for at least 30 minutes~~.

20.(previously presented) A method as claimed in claim 10, wherein deposition is carried out in a seven-dimensional space wherein flow rates of raw material gas, oxidation gas, carrier gas and dopant gas are set at fixed values, a total deposition pressure is set at a fixed value, a post-deposition thermal treatment is carried out, said post deposition treatment is selected from a group consisting of a set of predetermined treatments, and observed FTIR (Fourier Transform

Infrared [[Spectroscopy]]) characteristics are used to select said post deposition thermal treatment from said group of predetermined treatments.

21.(currently amended) A method as claimed in claim [[19]] 20, wherein the raw material gas is SiH_4, the oxidation gas N_2O, the carrier gas is N2, and the dopant gas is PH_3, the SiH_4 flow rate is fixed at about 0.20 std litre/min; the N_2O flow rate is fixed at about 6.00 std litre/min; the N_2 flow rate is fixed at about 3.15 std litre/min; the PH_3 flow rate is fixed at about 0.50 std litre/min; the total deposition pressure is fixed at about 2.60 Torr; the post-deposition thermal treatment is selected from the group consisting of: 30 minutes duration thermal treatment in a nitrogen ambient at 600°C; 30 minutes duration thermal treatment in a nitrogen ambient at 700°C; 30 minutes duration thermal treatment in a nitrogen ambient at 750°C; 30 minutes duration thermal treatment in a nitrogen ambient at 800°C; 30 minutes duration thermal treatment in a nitrogen ambient at 850°C; and 30 minutes duration thermal treatment in a nitrogen ambient at 900°C.

22.(cancelled)

23.(cancelled)

24.(previously presented) A method as claimed in claim 1, wherein a protective layer is deposited on the back face of the buffer layer on the back side of the wafer and a compensating layer is deposited on the front face of the wafer.

25.(previously presented) A method as claimed in claim 24, wherein the protective layer and compensating layer are silicon nitride.

26.(cancelled)

27.(cancelled)

28. (cancelled)

29.(cancelled)

30.(cancelled)

31.(cancelled)